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National Aid for
Highway Construction

Civil Engineering
B. S.
1905

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NATIONAL AID

FOR

HIGHWAY CONSTRUCTION

BY

GEORGE WALKER MORGAN

THESIS

FOR

DEGREE OF BACHELOR OF SCIENCE

IN

CIVIL ENGINEERING

COLLEGE OF ENGINEERING

UNIVERSITY OF ILLINOIS

PRESENTED JUNE 1905

U N I V E R S I T Y O F I L L I N O I S

May 15, 1905

This is to certify that the thesis prepared under the immediate supervision of Assistant Professor F. G. Frink by

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entitled NATIONAL AID FOR HIGHWAY CONSTRUCTION

is approved by me as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering

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Introduction.

During the last few years several bills have been introduced in the Congress of the United States providing for financial aid from the United States government in the construction of highways. Since these bills contained the expressions "permanent roads" and "kept in repair", it is evident that they were not intended to provide aid for the mere improvement of earth roads, but for the construction of broken stone, gravel, brick, or some other hard surfaced roads, any of which are termed "hard roads." The writer of this article attempts to discuss a few phases of the question of National aid for the construction of "hard roads." As a preface to this discussion there are a few remarks upon the importance of highway construction, its great development in Europe, and its history in the United States.

I. Importance of Highway Construction.

From the earliest times, the question of proper facilities for moving the products of nature or labor from place to place has been a most important one. For thousands of years the construction of a long line of highways was a subject of international importance. It is no longer so. The rail roads and waterways have entirely settled the question of long distance transportation. In the United States, the subject of highways has narrowed down to one of communication between farm and rail road, and the average distance between these is being decreased each year by the building of additional rail roads. This seems to decrease the importance of highways to such an extent as to make their construction and maintenance strictly a matter of local concern. However, such is not the case. No matter what may be the position of those in cities and towns, they are absolutely dependent upon the transportation of products. Proper facilities for transportation compose the most important factor in the life of a nation.

Transportation is not of primary import-

ance to the farmer. He has the means of sustenance at hand. The system of transportation concerns most vitally those who live in cities and towns. Raw material must come to the millions engaged in the trades; the necessities of life must come to all. The railroads and highways are the arteries of trade. Since the highways are the "feeders", collectively they are of as much if more importance than the railroads. All agree that the highways are important and that they should be just as good as conditions and circumstances warrant. There is no agreement however as to just what authority should decide what the conditions warrant, what authority should superintend the work, and who should share in the expense.

II. The Proposed National Aid.

Since the advent of the railroad with its facilities for long distance transportation, the public has felt that the government should have nothing to do with the question of highways. But within the last few years it has become the conviction of a great many well advised men that the General

Government should take some hand in the betterment of highways. This sentiment has already resulted in the establishment of the Bureau of Public Road Inquiries under the U. S. Department of Agriculture. Much useful work has been done by this department in the rendering of competent advice concerning construction, maintenance and material. Information is freely given and material is tested free. Letters of inquiry and samples of material are coming to the bureau from every state.

Many economists, statesmen and business men have decided that good, firm roads, passable the year round, contribute so much to the general welfare of the people, that it is a function of the General Government to give financial aid in the construction of such roads. In 1903 Mr. Brownlow, member of Congress from Tennessee, introduced a bill providing for National Aid. Its specific provisions will not be discussed here, as they vary little from those of the following bill. The latest bill of the kind is one introduced in the Senate by Senator Latimer of South Carolina, on Feb. 3, 1904, and reported with amendments by Mr.

Latimer on Dec. 7, 1904.

The bill provides;

1st:- For the creation of a bureau in the Department of Agriculture to be known as the Bureau of Public Highways. The object of this Bureau to be to co-operate with the various states in the construction of permanent highways, to make investigations and experiments with regard to road-building materials, to co-operate in constructing object lesson roads, to publish bulletins and reports, and to establish system in the construction of roads throughout the United States.

2nd:- For the appropriation of twenty four millions of dollars to be available at the rate of eight millions of dollars per year, and to be divided among the different states according to their population, except that no state is to receive less than three hundred thousands of dollars, and in computing the population of a state, no city shall be accredited with more than ten thousands of inhabitants.

3rd:- Each state or civil subdivision receiving federal aid must add a like amount to the sum received from

the United States government.

4th.- Any of the appropriation not expended in the year named shall become available the succeeding year.

III. Present System in the United States.

1. Condition of Roads:- Has there been as much improvement in the highways of this country as could reasonably be expected? Although this is almost the richest country on earth, there has been less improvement in its highways than in those of any other highly civilized country. This is probably due to the fact that in the greater part of the country, the railroad preceded the highways and dispensed with the need of long distance transportation over them. If longer roads had been required, probably more skill would have been used in laying them out. Most of the roads have been laid out along township lines without any regard to swamps or hills. It is exaggerating to claim that they have not been much improved since their laying out. Bogs have been drained, hills lowered, and roads graded. However, a very small percentage of the hundreds of thousands of miles have been permanently

and well improved.

2. Cost of Construction and Maintenance fall on the Farmers:- With but few exceptions, the cost of construction and maintenance of roads is all charged to the farmers owning near by property. When the farmers of a community know that they will have to shoulder all of the expense, they hesitate about building costly roads even if they think such roads would be profitable in the long run. Probably many communities in each state would gladly assume a part of the charges, if they could receive aid from state or national government. Some of the state governments have given such aid. This is discussed in the next article. Outside of these states, each community is paying the entire cost of the improvement of its roads, be this much or little.

3. The Supervision and Labor:- It is useless to propose or expect a greatly improved road system under existing laws and methods of supervision. With few exceptions the whole matter is left in the hands of county or district officers, who are elected for very short terms and have little knowledge of improved

methods of road construction. Even if left in the office a sufficient time to acquire such knowledge, the money to make it most effective is lacking. Much of the road tax is paid by labor which is often indifferently applied or is "worked out" at a time when little good is done to the road.

IV. Some Other Systems.

1. Government Aid in European Countries.- In many of the European countries the people have seen fit to place the matter of the construction and maintenance of roads under the direction of a department of the national government, and to pay a certain percent of the costs from the national treasury. This has almost invariably resulted in the training of expert supervision, the accumulation of valuable knowledge concerning construction and maintenance, and hence the most economical expenditure of funds.

The earlier roads built in Europe at national expense were for military purposes, but the European improved highways of today are not military roads. Most of them have been built to cheapen the cost of transportation. A great many have been built to invite tourist

Only after hundreds of years of experience with roads of all kinds, have the European countries decided that it was the function of the general government to assist in highway construction. National aid has been tried successfully in Ireland, England, France, Germany, Scotland, Italy, Austria, Belgium, Spain and other countries. In no single case have the roads been greatly improved where national aid has been withheld. Mr. Isaac B. Potter, C.E., is authority for the statement that in each case of twenty three European countries or states examined, the quality and condition of a public road are raised or lowered in about the same measure that the general government bestows or withholds its official direction.

France has about twenty four thousand miles of stone roads, built and maintained by the general government. By many who are acquainted with the conditions, it is asserted that the proverbial thrift and contentment of the French people is due in large part to the good highways. The large mileage of hard wagon roads is not due to a small mile-

age of railroads, for in proportion to area, France has double the railroad mileage that the United States has.

2. Early Government Aid in the United States:- Federal aid for road building is not a new thing in this country. In the early days of the republic the building of roads was a very serious concern to the General Government. While the improvement of rivers and harbors was yet considered a function of the state governments, the General Government was laying out and constructing roads. In the early part of the nineteenth century the government laid out about twelve national roads and expended about fourteen million dollars upon them. The old Cumberland Road is the most famous of these roads. Five or six million dollars were expended upon it. Other improvements so absorbed the public mind that the appropriations ceased about 1825. Of course these roads served entirely different purposes than the roads of today. They were long roads over which produce passed to the cities and settlers travelled to newly opened country. Appropriations for their construction were made on exactly the same

principle on which appropriations were later made for aid in railroad building.

3. State Aid in the United States.

Recently a number of states have given aid from the state treasuries for the construction of highways.

New Jersey has appropriated more than one million and five hundred thousand for this purpose. One thousand miles have been built or contracted for and applications have been received for six hundred miles more. The state pays one third, the counties two thirds.

Connecticut has spent over one million and five hundred thousand dollars in state aid. About five hundred miles of road have been built or contracted for. The state pays two thirds, the towns one third.

Massachusetts has appropriated about five million dollars. Five hundred miles have been built and one thousand miles have been petitioned for. The state pays three fourths of the cost, the counties pay one fourth.

New York has appropriated over two million dollars as state aid. About four hundred and ninety miles have been constructed and four thousand miles have been petitioned for

and are awaiting appropriations. The state pays fifty percent of the cost, the counties thirty five percent, the towns fifteen percent.

Pennsylvania's appropriations for road building have amounted to six million, five hundred thousand dollars. The state paye two thirds, the counties one eighth, the townships one sixth.

A few other states have aided in the work of road building, the aid taking widely varying forms. In almost every case of state aid, applications have been made in excess of the available funds or material. It is then but reasonable to suppose that national aid would cause a similar stimulus to road building in almost every state.

It has been argued that if certain states can improve their roads, all can do the same if they have the same interest and enterprize. The states giving aid have been very wealthy states. Wealthy because of location and circumstances. Great manufacturing interests are centered in them and capital controlling enterprizes world wide ~~is~~ located in them. A very small rate of taxation in such states raises an immense amount of revenue, whereas a high rate in the poorer states,

where probably good roads are most needed, would not raise a large amount. For this reason, state aid will not become general and national aid is the only plan that will bring outside aid in the general building of hard roads.

V. Do the Present Conditions Warrant Extensive Building of Highways?

This country has made more startling advance along all lines of progress than any other country in the history of the world. It has done so without the aid of hard roads, and has not ceased to advance. Then why build hard roads at all? Practically every coal and ore mine in the country has its railroad connection. Hard roads would not increase the mineral output. We are using our lumber faster than is expedient in the face of the alarming rapidity with which our forests are disappearing. No need to build roads to the forests is pressing upon us. The most pertinent question in this connection is; Could the proposed building of hard roads in any average community promise such an increase in the surplus of farm products, such a decrease in the cost of marketing, and so much

improvement in the social conditions of the producers, that the construction of the roads would be a reasonable and sane proposition?

VI. Advantages of Hard Roads.

All know the advantages of good roads, but most of the roads are good during only a portion of the year. The following statements are concerning the advantagee of hard roads, i.e. roads presenting a firm, smoth surface the year round.

1. Saving in transportation:- The principal financial advantage is that due to a saving in the cost of transportation. Few realize the large element which transportation makes in the cost of every supply. In this day of railroad transportation, very little hauling other than that incident to the business of farming is done over the highways, but this alone is of enormous volume. Much has been said and written concerning the cost of this transportation. In Circular 19 of the Office of Public Road Inquiries, it was estimated that the average cost of transportation per ton is 25 cents per mile, and that the total cost of transporting the products of the farms of the United States

to market is over $1,000,000,000. If this were the case, the building of hard roads, enabling the farmers to haul heavier loads, would result in an enormous saving. However, the fallacy of such a conclusion has been well established by men well versed on this subject. (See Baker's Roads and Pavements.) The farmer's time and the use of his horses are the principal items in the cost of transportation. The farmer is seldom compelled to take time from remunerative employment to market his crops. He does this at times when no other work is very pressing. Any claim of losses due to the maintenance of extra horses for the marketing of crops is imaginary, as far as the farming class is concerned. That portion of the farming population including gardeners, florists, fruit growers and dairymen keep a few extra horses for marketing, but in 1900 this portion was only 4% of the total number of farmers. The representative farmer requires for marketing crops only the horses required to raise the same.

The actual cost of transportation is just a trifle more than the average price farmers would be willing to pay to have their produce hauled by outside help while they

applied their own time and that of their teams to some other work. This would be far less than 25 cents per ton per mile. In fact it would probably be about half that much. This would make the total cost of transportation of the farm products over $500,000,000 per year. This could be reduced with hard roads. A seemingly conservative estimate on the amount of the reduction of the cost is 40%. On this assumption it would require a complete system of hard roads to result in an annual saving of $200,000,000 in the transportation of farm products. Both producers and consumers aid in paying for the transportation. Any saving would be divided between them, the producers receiving a higher net price for raw produce, the consumers getting the finished product at a lower price.

2. Permit marketing at any time:- Hard roads permit marketing to be done when the prices are highest. Very frequently, farmers could obtain a much higher price at one time than at another if they could only get their produce to market. The farmers who live in localities which have hard roads, know that this is a real advantage. However,

if hard roads became general, one of the largest factors in the fluctuation of prices would be removed. The price of any staple for a given year is of course determined by world-wide conditions, but the daily or weekly fluctuations are not determined by such conditions. If farmers all over the country were able to market produce the instant its price rose, there would be very little fluctuation. Hence, the advantage of marketing when prices were high would be eliminated by the general building of hard roads. It will exist only so long as a small percentage only of the roads are permanently improved.

Hard roads permit marketing at times when the labor of producing is least pressing. The roads are naturally in their worst condition at times when the farmer has the least to do. Consequently, he is compelled either to market in small loads during the time when work is slack or to take time during the busiest season if he wishes to market his last crop in good loads. It is difficult to state how much of an advantage it is financially, to be able to market during

the dull periods on the farms, but it certainly aids in the convenient and economic distribution of labor.

3. Regulate trade conditions:- As was pointed out in the last section, hard roads would permit marketing at any time, and if there were a sufficient number of hard roads, the prices of staple products would be almost stationary throughout a year. The general building of highways would undoubtedly tend to regulate trade conditions, not only in some locality, but all over the country. R. G. Dunn & Co., who are certainly competent to judge as to causes of depressions in trade, have often stated that a general depression in trade was due in many instances to the condition of the wagon roads. A very large proportion of the roads of the country become almost impassable at the same time of year. On the other hand, most of them reach their best condition at about the same time of year. This results in excessive shipment and congestion of traffic at times, and almost a cessation of shipments at other times.

4. Improve Social Conditions:- The question of the social advantages of good roads

is almost as pertinent as that of financial advantages. The ordinary earth road is good during a large portion of the year, but just when they are at their worst, the farmer has the most time for social intercourse. We may say then that one of the principal advantages of hard roads is that they,

a. Facilitate Communication and Social Intercourse:- The social life of a community is very important. If people in the farming communities spent more time in the exchange of visits with neighbors, there would be much more enjoyment and greater contentment among the farmers. Hard roads would give an opportunity to enjoy social intercourse without the loss of valuable time, i.e. during the season when the farmers had the most leisure. At this season, the earth roads are so bad that a farmer will not even go to the nearest neighbor's except on urgent business.

Hard roads facilitate social intercourse between urban and rural populations. The social advantages of cities and towns are not as great as some assume. Much visiting in any city is not conducive to a higher tone of moral life. The farther rural com-

munitees are removed from some phases of city life, the better off they are. The country is the fountain head of the nations life. From its overflow the city population is formed and renewed, hence the importance of keeping the country life clean. City life is not altogether elevating and refining. Yet there is sufficient attraction about it to cause too large a drain of young life from the country to the cities. The young people of the country perhaps do not need social intercourse with city populations, in fact it may not be the best thing for them, but they desire it and are leaving the farms in legions to seek it. Rural free delivery has brought one of the great advantages of the cities to many rural districts. This has had much influence in checking the tendency toward urban concentration. The inter urbans have done much toward checking the same tendency wherever they have been introduced. This seems to indicate that if the young people can stay on the farm and enjoy its benefits, at the same time having easy access to a city or town, they are willing to stay. President Roosevelt has said,

"No one thing can do so much to offset the unhealthy drain from the country into the cities as the making and keeping of good roads."

As far as the actual needs of the two classes are concerned, the city population needs to get to the country more than the country population needs to flock to the cities. The states which show the greatest degree of education exceed in the evils of insanity, suicide, nervous diseases, criminals and almshouse paupers. This is seemingly paradoxical, but the conditions are not due to the education of the people. Authorities on the subject declare that the conditions are due to the concentration into cities. The increase in urban population has been remarkable. In 1800 the percentage of urban to total population in the United States was 4; in 1900 it was 66.2. Railroad development has centralized the population in cities and towns arranged along their lines of communication. Our bad wagon roads tend to keep them there. Probably one of the most beneficent effects of a general system of

hard roads would be the partial relief of the congestion in cities.

b. Hard Roads Aid in the Betterment of Schools:- It seems now that good roads will soon be almost an absolute necessity in the conduct of the country school system. This is an age of consolidation along all lines. Many prominent educators are predicting the consolidation of small country schools into larger schools in the near future. This will result in a more economic and efficient service. At present the greatest objection to the consolidation of the country schools is that it would greatly increase the distance between homes and school. Consolidation of schools has already been accomplished in some localities and it has been easiest where there was a system of good roads.

c. Hard Roads Aid in Mail Delivery:- No government movement of late years has resulted in greater immediate benefit to the country people than the establishment of rural free delivery of mail. If good roads aided very much in this service, it would be a strong argument in their favor. But

they do not greatly increase the efficiency, except by permitting one carrier to take a longer route. Hard roads would aid the carriers in making their rounds more quicly and comfortably, and hence increase to some extent the efficiency and scope of the service.

d. Hard Roads Increase Land Values:- As a consequence of all the benefits and advantages accruing from hard roads, it is generally acceded that the price of adjacent farm land increases. There are so many factors entering into the value of farm land, however, that one cannot claim that the increased value of land adjacent to a hard road is due altogether or even in large part to the building of the road. In the last decade of the 19th century, there was not much building of good roads, yet the value of farm property in the United States increased 48.9 %. This is the most rapid advance in land values in the history of the United States. If a general system of hard roads had been built during that period, this remarkable increase would have been attributed to

that cause, whereas it was due almost entirely to other causes. However, it has been proven by experience that in all ordinary instances good roads increase the price of adjacent land. No state west of the Alleghenies has done as much hard road building as Indiana. Prof. Latta of Purdue University gives $6.50 as a conservative estimate of the average increase in the selling price per acre due to hard roads.

Wherever an interurban line has run, it has increased the price of land. It seems from past experience that an interurban line enhances the value of adjacent land as much as a hard road does. Yet the interurban confers benefits mostly social in their nature, as far as the farmers are concerned. They do not aid the farmers in the marketing of crops. This seems clearly to indicate that just as high a cash value is placed upon the social advantages of an easy line of communication as upon the actual financial benefits.

During the present agitation on the hard road question, many are citing examples

of the fall in price of farm lands adjacent to hard roads. Such cases are of course exceptions to the general rule. It would hardly be likely that the people of Indiana would have in view at the present time the building of hundreds of miles of hard roads, if decrease in land values often followed their building. Where such a thing has occured the cause has been one of the following, or several of the same combined.

1st, The land has been poor and not very valuable under any circumstances.

2nd, The land has been situated in a community which the farmers were leaving to take up much cheaper and virgin land in the west.

3rd, The improved road has been on two or three sides of a farm, causing very high assessments without corresponding benefits.

4th, All of the expense has been assessed on the community. If the adjacent property were assessed only one half, or perhaps even less, as would be the case under national aid, cases of depreciation of land

values immediately or remotely following the construction of hard roads would be very rare.

VII. Effect of National Aid.

There are two standpoints from which the probable effect of National Aid may be considered. We may either consider it from the standpoint of one noting its effects upon some community or from that of one noting its effects on the general public.

A. Local Effect. Let us inquire somewhat into the effects upon a community in case National Aid were offered and accepted. We have discussed in a general way the advantages of a system of hard roads. Following the same line of thought in discussing the effects of hard roads we may divide them into two classes, financial and social.

a. Financial:- Before expending large sums of money for roads, the people of the community ought to know whether the investment will be a paying one financially. To find this out would require the same sort of investigation that other proposed investments require. The items representing savings, in-

creased values and additional receipts should be placed in one class, those representing losses or additional expenditures in another class. If the sum of the items of the first class exceed the sum of those in the second class, it will of course pay to build the roads. Among the items which belong to the first class are:-

1st. Saving on Transportation. On hard roads a farmer could haul more with a wagon and team than on earth roads. This would decrease the cost of transportation a little and in the old adage "What is saved is made." In this connection it is often argued that there is less wear on wagons and animals on hard roads than on earth roads and that this reduction should be added to the saving on transportation. There is probably less wear on vehicles on hard roads than on earth roads, but hard roads are much harder on horses than earth roads. Besides, the horse-shoeing bills are much larger with hard roads than with earth roads, for the horses must be shod the year round instead of only a few weeks or months; as is the case with earth roads. The actual

amount of saving on transportation would of course vary in every community and with every farmer.

2nd. Increased Land Values: As has already been pointed out, there are very few communities in which the building of hard roads would not be followed by an increase in the land values.

3rd. More Land for Farming: At the present time, most of the country roads are 66 feet wide or even wider. This great width is to permit the distribution of traffic over a wide space and to permit of grading. If hard roads were built, 33 feet would be ample room for a roadway, except in hilly or mountainous countries. This would leave on each side of the road, a strip 1 rod wide, the use of which could be returned to the farmers. In this way 1 acre would be added to every 160 acres. Of course the waste of farm land is as yet a matter of little concern in this country, but with immigrants coming to this country at the rate of almost a million a year, it will not be long before a more economic use of land will be necessary.

4. Wages for Labor and Teams:- In a community where hard roads were constructed, money coming both from the community and the government would be expended, giving employment to labor, teams and wagons. The greater part of the cost of construction would be in the preparation of the road bed and the laying and compacting of the material. Most of this work would be done by the farmers themselves at good wages for labor and teams. In many cases where roads have been constructed farmers have received for their work almost as much as their total assessment for the improvement. The author consulted several who claimed that they did this without any serious neglect of their farm work.

Among the items which represent losses or additional expenditures in the case of hard road construction are,

1st, Cost of Construction:- Under the proposed national aid plan, the general government pays one half the cost of construction of any hard road and the state or civil subdivision of the state pays

the other half. If the state aided in the payment of the costs of construction, the communities share would of course be less than one half of the total cost. However, its share could not be more than one half. The cost would vary greatly for different communities, but it would be about the same for all communities in proportion to their ability to pay, for in general the richest, most productive lands are farthest separated from good road-building material. Because of the number of different kinds of hard roads and the great variation in the cost of any one kind in different localities, the author has not attempted to give any numerical values as the cost for any particular locality. The estimate of the cost of hard roads is more likely to be too high than too low, for people generally base their estimates on the cost of city pavements. The roads would not be as wide as city pavements, neither would they be constructed to bear as much traffic. Besides this, National Aid would insure expert supervision and a more economic use of material and labor. The cost

would almost certainly be reduced some by the introduction of convict labor for the preparation of material.

Convict Labor:- Hard roads could be constructed at a much less cost under national and state aid than is possible under present conditions. A large part of the first cost is in the material. No state in the union is utterly devoid of some good road making material, and as soon as the state authorities became directly interested in the expenditure of large sums of money for roads, many of the states would devise plans for the preparation of this material by state prisoners. In 1900 about 100,000 able-bodied prisoners were being maintained by the tax payers. In many states, prisoners are not compelled to work and are marched about the prison courts for exercise. In states where the prisoners do work at trades, the indignant protests of organized free labor will soon force the abandonment of the practice.

The labor of the prisoners in any state, if properly directed, could provide the material for hundreds of miles of road in a

few years. This work would not be a menace but a stimulus to free labor.

The plan of working convicts upon the roads has been tried in a few of the southern states but is not generally approved and is not an unqualified success; but the preparation of road material has been very successful where ever tried. In California the best of road material obtainable in the state is furnished, prepared and on board cars, at 25 cents per ton, and this pays for the maintenance of the convicts. The convicts themselves prefer working in the open air during good weather to sitting all day in gloomy cells. The plan of having convicts prepare material is not impracticable. Many labor leaders and statesmen consider it the only logical solution of the convict labor question. Of course the stone would be crushed by machines but the convicts could be made to quarry the stone, feed it to the crushers, and load it on cars. National or state aid would facilitate the rapid and general introduction of convict labor for the preparation of road material and would in this way tend to lower the cost of hard roads.

2nd, Increased Cost of Maintenance;-

The annual cost of maintaining in good condition any kind of a hard road is of course much more than that spent upon the earth roads of the locality. It is impossible to state even approximately how much the average percent of increase in the cost of maintenance is. The percent would vary with almost every locality. No matter what the percent has been, it is unusual for the people of a locality that is enjoying the benefits of good roads to complain of the increased cost of maintenance. The farmers along the excellent gravel roads of Indiana do not long for the old days of dirt roads and cheaper cost of maintenance. They consider their good roads almost indispensable. The people of France, where the cost of maintenance is very high because of the great traffic, feel that the money spent in this way is used to good purpose.

Under the proposed National Aid, the government pays only the cost of construction of any important road only on condition that the community assumes the responsibility of maintaining the road in good condition. The last bill, which was offered in December

1904, by Senator Latimer, provides "that the highway or section thereof when constructed or improved will be maintained and kept in repair without recourse upon the United States."

3rd, Increased Taxation;- Since the building of good roads would increase land values, they would increase the general tax. This would be an additional expense due to good roads. But a considerable rise in value of lands makes little difference in the amount of general tax paid. If the land increased in value #20.00 per acre and the rate was 1% the increased tax on 160 acres would be #6.40 per year in those communities where the assessed valuation was one fifth the real value.

The question as to which of the two classes of items just mentioned would be the greater in amount is one that could be answered only after careful consideration of all the conditions in any one community. It is certainly true that in some communities the latter would exceed the former, and hard roads would not be a paying investment in such communities.

b. Social :- The effect of hard roads upon the social life of a community in which they are built is perhaps greater than one is inclined to believe. It is difficult to describe this effect and still more difficult to measure its value in dollars and cents. It must not be forgotten in the discussion of this question that the ordinary earth road is good at least three fourths of the time. During the late spring, summer, autumn and early winter, it would make little difference in the social advantages of a community, whether it had hard roads or earth roads. It is during the late winter and early spring that the people have the most leisure and the greatest inclination to social enjoyment. At this time it makes a great difference to a community whether it has hard roads or earth roads. It is the seclusion during this portion of the year that causes so many to leave the farms. Hard roads, then, would probably tend to keep some of these restless people in a community. By increasing the social advantages, hard roads would probably affect the well-being of a community by the retention of young life. However, the question as to just how much so-

cial conditions would be improved is doubtful. For one thing, school and church attendance has not increased where hard roads have been built.

B. Effect on General Public.

In some respects National Aid would affect only the communities in which the proffered aid was accepted and hard roads were built. In other respects, it would affect the public at large. Some of these broader results will now be considered.

a. More Roads Built Than at Present;- Would there be more hard roads built under National Aid than are being built now, i.e. would there be a larger number of miles built per year? If the farmers of any community could build good roads for less than one half the present cost to themselves, it is probable that many communities would build that do not think of doing so now. The inducements under state aid are about the same as are proposed under National Aid and every state granting aid has applications in excess of the appropriations. It is but reasonable to suppose that such would be the case under National Aid and that each states apportionment

would be quickly used.

On the other hand, it is quite possible that very few more miles of road would be built per year than are built at present. In each state there are localities where the people are building roads without outside aid. These localities, realizing the benefits of hard roads, would of course continue to build at a slightly increased rate when National Aid was offered. In this case the government would be aiding in building roads that would have soon been built without such encouragement. If road building did not extend into localities where it had not been previously practiced, the increase in the rate of building hard roads would not be very great under National Aid.

It is often stated that the proposed appropriation would not go very far in the building of roads. The advocates of the bill do not pretend to aid in improving all the roads of the country with $24,000,000. They claim that if the expenditure of this $24,000,000 proves successful, there is no reason why the United States should not make an annual appropriation for this purpose for years to come.

It is of course realized that this first appropriation is small and that the whole measure is in the nature of an experiment. But just what would this first small appropriation do? The apportionment for Illinois would pay for one half of the cost of construction of about 600 miles of road at an average cost of $5,000 per mile, that for Indiana would pay for one half the cost of construction of 1,200 miles at an average cost of $1,200 per mile, that for Ohio, 600 miles at an average cost of $4,000, etc. It can be conservatively stated that this first appropriation of $24,000,000 would assist in the building of 12,000 miles of permanent roads.

b. Effect on Trade.

The first appropriation for National Aid would cause only a temporary impetus to trade, but continued appropriations for this purpose would be followed by lasting and permanent benefits to trade.

1. Temporary Impetus to Trade;- The first noticable effect of National Aid would be the great temporary impetus to trade. The manufacture and sale of road machines,

the preparation and transportation of material, and the expenditure of thousands of dollars for labor in almost every county would surely give a great impetus to trade. This would probably last for three or four years, but at the end of this time, in case the appropriations were not continued, the sudden cessation of all of the above named activities would cause a depression in trade more direful in its effects than the temporary impetus had been helpful.

2. Permanent Effect on Trade;- The few thousand miles built under the first appropriation for national aid would not be sufficient to affect trade conditions permanently, but if the experiment proved so successful that further appropriations were made, until many thousand miles were constructed, commerce and trade would be permanently benefitted. R. G. Dunn & Co. in their trade reports often state that "There is a general depression in trade due to the bad condition of the country roads". In 1904, the president of the New York City Chamber of Commerce declared in a speech before that body that as soon as the improved

methods of production and manufacture now in vogue in the United States are adopted by foreign countries, the United States will be handicapped in the markets of the world because of her great losses in primary transportation.

c. Increased Manufacture;- As has already been stated, the first effect of National Aid would be to increase the manufacture of road making machinery, such as scrapers, graders, rollers, etc. As a later and more permanent result upon manufacture, there would be an increased demand for vehicles, automobiles and bicycles. This result would follow the building of even a few miles in each county. The blatant cry about aiding trusts is inadvertently sounded. There are no bicycle and automobile trusts, nor are there likely to be, for trusts deal in necessities, not luxuries or conveniences. Even granting that there would be such trusts formed, no thoughtful person imagines that a great increase in mainufacture would not benefit every class of people.

d. Establish National Aid Roads As Object Lessons;- It is to be hoped that roads

built under this appropriation, with expert supervision and by approved and tried methods, would be excellent roads. Even if National Aid were never extended farther, the roads built by the first appropriation would serve as models for any built later by the communities, or if defects developed, they would teach the people what to avoid.

The importance of even a short stretch of good road in influencing the people in favor of building more of them can hardly be overestimated. If a few miles were built in each county, extending in each direction from the county seat, it could reasonably be expected that the system would grow until there were many miles in each county.

Railroad officials believe in hard roads, not simply because of the road material to be hauled (some roads offer to haul the material free of charge, but because they believe there will be more produce to haul after the hard roads are constructed. In 1901 three of the greatest railroad systems in the United States, viz., the Illinois Central, Lake Shore,

and the Southern equipped and sent over their lines "Good Road trains." These trains carried a full equipment for the building of hard roads. They were in charge of experts and officials of the Office of Public Road Inquiries. Not only were conventions held, but in many places demonstrations were made and short stretches of road were built as "Object-Lesson Roads."

e. Result in Better Earth Roads;- National Aid would result in better earth roads. If National Aid were granted, there would be at the immediate disposal of any community in the United States, one half the cost of constructing hard roads. This would result in a thorough discussion of the whole subject. It is quite likely that so much attention would be directed to the road question, that the condition of the earth roads would be greatly improved. If only a few hard roads were built, the thorough agitation, discussion and study of the question, resulting from the availability of government funds, would surely lead to much better practice in the main-

tenance of earth roads.

f. Increased Taxation;- Under the provisions of the proposed law, the United States government would pay one half of the cost of highway construction. Within the three years following the passage of the bill, $24,000,000 would be paid out of the treasury for this purpose. Most of our revenue comes from duties on imports. Now, over two thirds of the people of the United States live in cities or villages, and they are the greatest consumers of the class of imports on which our revenue is collected. The people of the cities would then pay two thirds of one half, or one third of the cost of highway construction. As $8,000,000 per year would add very little to the cost of dutiable imports, no one would be unduly burdened by increased taxation. Even if levied as a direct tax on the true valuation of the real and personal property in the United States, which was $94,000,000,000 in the year 1900, the levy of $8,000,000 would amount to 8½ mills per $100 or 85 cents on a $10,000 farm.

Naturally, the greatest opposition to

either national or state aid exists in those localities where hard road construction would be most difficult, as in the "corn belt" of Illinois. The farmers of such localities declare they have no intention of ever building hard roads in their own localities, consequently they do not wish to aid in their construction elsewhere. The truth of the matter is that the average farmer and his family would not contribute more than 50 cents per year toward "helping" some distant community build roads, and he would never know that he had contributed that much.

Under National Aid, one half the cost of construction is to be paid by the state or civil sub-division thereof, but the government does not concern itself with the manner in which this half of the cost is distributed. In many states, some portion of it would be paid by the state and the remaining portion by the locality in which a road is built. In case this plan was adopted by any state, it could pay its share in road material, prepared by convict labor, and delivered

by the railroads at very low rates. Consequently little additional burden would be placed upon the people by any state in raising its portion of the cost.

C. Some Expenditures Which Have Been More or Less Local in Effect.

The United States frequently appropriates money which confers benefits more or less local in their nature. Some of the most favored objects of these appropriations are given below.

1. Government Buildings in Cities;- Recently millions of dollars have been spent in erecting government buildings in cities. Of course, these buildings are used for government purposes, but they are undoubtedly more or less local in their benefits. They are not always built where there is the greatest need for them. Only especially favored localities can obtain them.

2. River and Harbor Improvement;- The government has generally considered roads, canals, rivers and harbors as in one class, for it is these four factors of transportation combined that have made possible the wonderful commercial activity

of this country.

Of these four, river and harbor improvement has been the subject of most concern to the government. Upon the rivers and harbors, the sum of #176,000,000 has been expended during the past 10 years, and altogether the United States has expended the vast sum of #500,000,000 for river and harbor improvement. Such improvements have helped all of the people some, but it has certainly helped or benefitted the people of the river and harbor cities more than others.

3. The Panama Canal;- The United States government proposes spending #200,000,000 or more in building the Panama Canal. This will not bestow "local" benefits upon any portion of the United States, but it will give special advantages to a class of citizens, for if ship owners have made a profit by shipping around Cape Horn, their profits will be much increased when they can cut down the distance of transportation more than one half. Of course all classes will be benefited some by the completion of so great a work.

4. Land Grants to Railroads:- The Government has given railways land grants amounting to some 196.000.000 acres. This land has been sold for untold millions of dollars which has enriched individuals. These great gifts have been and are excused on the ground that they brought about the development of the west by aiding in the building of railroads. But private capital would soon have developed western resources and built railroads without national aid. The development of the west was inevitable and was only hastened by government aid to railroads.

VIII. Could the Government Afford the Expense?

It has been estimated by the Office of Public Road Inquiries that one billion dollars would put all of the main roads of the country in good condition. This would make the total cost to the government five hundred million dollars. Let us be conservative, and assume that the construction of all of the main roads would require a half century. The appropriation of five hundred million dollars

for road building in a period of fifty years would not bankrupt or even embarrass the United States government. It has spent more than this amount on the Philippine islands in five years. Great care is needed in the expenditure of public funds, but a proposition should not be passed by merely because it is extensive. The most careful expenditure of public funds is that benefitting the largest proportion of the people. If national aid for highways would benefit a larger proportion of the people than would some other forms of government expenditure, the government can well afford it. There are several considerations that would lead one to conclude that the United States could well afford a liberal expenditure on roads.

1st. Small Army:- In proportion to its population, the United States has a smaller army than that of any other great nation of the world. The location and other conditions which make this possible are wonderful advantages and result in almost inestimable saving to the United States government. The large armies of the old

world countries cause immense drains upon their treasuries. If only a small proportion of the amount saved to the United States by the possibility of a very small army were spent in highway construction, it would soon build all of the important roads. France, with a population only one half as large as that of the United States, supports an army ten times as large as the United States army. Yet the French government spends $18.000.000 per year for highways, while some think that the United States government could not afford $8.000.000 or $10.000.000 per year for that purpose.

2nd. Large Navy:- If a country like the United States, with enormous internal resources, and almost free from danger of invasion, spends over $100.000.000 per year on its navy, it could easily afford to expend one tenth that much on any internal improvement. The Army, Navy and Fortifications of the United States will have cost $498.000.000 more during the four years from 1902 to 1906 than they did during the four years from 1892 to 1896. Carnegie and several other great men have declared that

a large portion of this money spent on the navy had been spent in aiding internal improvements, the results would have been just as efficient in case of war, and far more beneficial during either peace or war.

3rd. Reduction in Pension Roll:- There is no reason why there should not soon be a large reduction in the pension roll. At present $140,000,000 per year is being paid to our old soldiers and to soldiers' families. It has been over forty years since the great civil war and the ranks of the brave men who fought in that conflict are being rapidly depleted. The roll of the Spanish-American War veterans is so small that the number of pensioners added from it will be small. The reduction of the pension roll may not come in the immediate future, but if all "graft" is eliminated, as seems probable under Commissioner Warner, there is sure to be a large reduction soon. A portion of this reduction could be turned to the aid of internal improvements.

It is a well known fact that at the present rate of receipts and expenditures, the United States government is facing a defi-

In 1904 the expenditures were $1,770,000 in excess of the revenue. But this is not a very serious matter. The revenue can be much increased without unduly burdening the people.

IX. The Demand For National Aid.

The demand for National Aid in highway construction has not become general. A strong movement has grown up, having for its object the betterment of road conditions, and a few road conventions, state granges and state legislatures have passed resolutions indorsing the plan of federal aid, yet it cannot be said that the sentiment in its favor is very general.

From the sentiments of many resolutions adopted by large bodies of farmers, one would conclude that the people in some communities would not accept hard roads, even if they could have them built free of any cost to themselves. At first thought such an idea seems foolish, but there is evidently some justification for it. Many intelligent farmers claim that for ten months in a year or at least for nine months, the soil in the greater portion of

the country compacts until it is the best kind of road for country use, i.e. one both smooth and slightly yielding. Some claim that even leaving out of consideration the difference in cost of the two systems, they would prefer the earth road, with its smooth, yielding surface for ten months, though it were almost impassable for two months, to any road having a hard, unyielding surface the year round. They argue that as far as the wear and tear on animals and vehicles is concerned, the sum total of that on hard roads would be much greater than that on earth roads. Hence there are many localities where there is the greatest opposition to either state aid or federal aid legislation.

X. The Charge of Paternalism.

It has been charged that the proposition of National Aid for highway improvement is paternalistic; but it would tend to make the people less dependent on their own resources and energies. If the government paid all of the cost, the measure would be paternalistic, for it would be assuming that the communities could not be relied upon to

bear a portion of the cost. If the government arbitrarily determined what communities should build roads, the measure would be paternalistic, but the matter is entirely optional with any community; the government in no way assumes strict control over the business of any community by the introduction of National Aid. If the proposition gave to any class of people money to be spent in private enterprises, it would be paternalistic as well as unconstitutional; but there is nothing more strictly "public" than a public highway. They are of importance to the whole people. Of course the farmers use the roads more than any other class, but they do not simply haul produce from the farms to the cities; they haul the products of factory and mill from the cities to the farms. The fact of the matter is that when a farmer is on the road he is doing draying for all classes of people, hence the condition of the roads is of importance to all classes. Since good roads confer benefits upon the public, they should be partially paid for by the public. The only way to bring this about is by means of National Aid, for national funds come in

large part from dutiable imports and every consumer contributes some to such funds.

If the government undertook to aid the people of a community in any enterprise which was private in nature, such as the building of homes, it would be aiding in the construction of something which would immediately be closed to the public, and which therefore ought to be left to private enterprise. But primary transportation is of so great importance that public roads are surely not to be classed with any private or semi-private enterprises.

One of the greatest proofs that National Aid is not paternalistic in its tendencies is the fact that France has had National Aid since the time of Napolean the First, yet the French people are greatly opposed to paternalism and are exceedingly thrifty and self-reliant.

XI. Constitutionality.

The power of appropriation by congress is limited by the constitution to objects which are for the general welfare, which are national in scope, and which benefit the whole people. An appropriation is all that

is asked for under the proposed National Aid. The Government is not asked to undertake the actual construction or improvement of roads.

Congress has the power to make the appropriation, for it has made appropriations that were much less beneficial than this one would be. In the case of some of the canals which have received appropriations, for example the Hennepin in Illinois, it must have required a considerable stretch of the imagination of the legislators to see in them a benefit to the whole people.

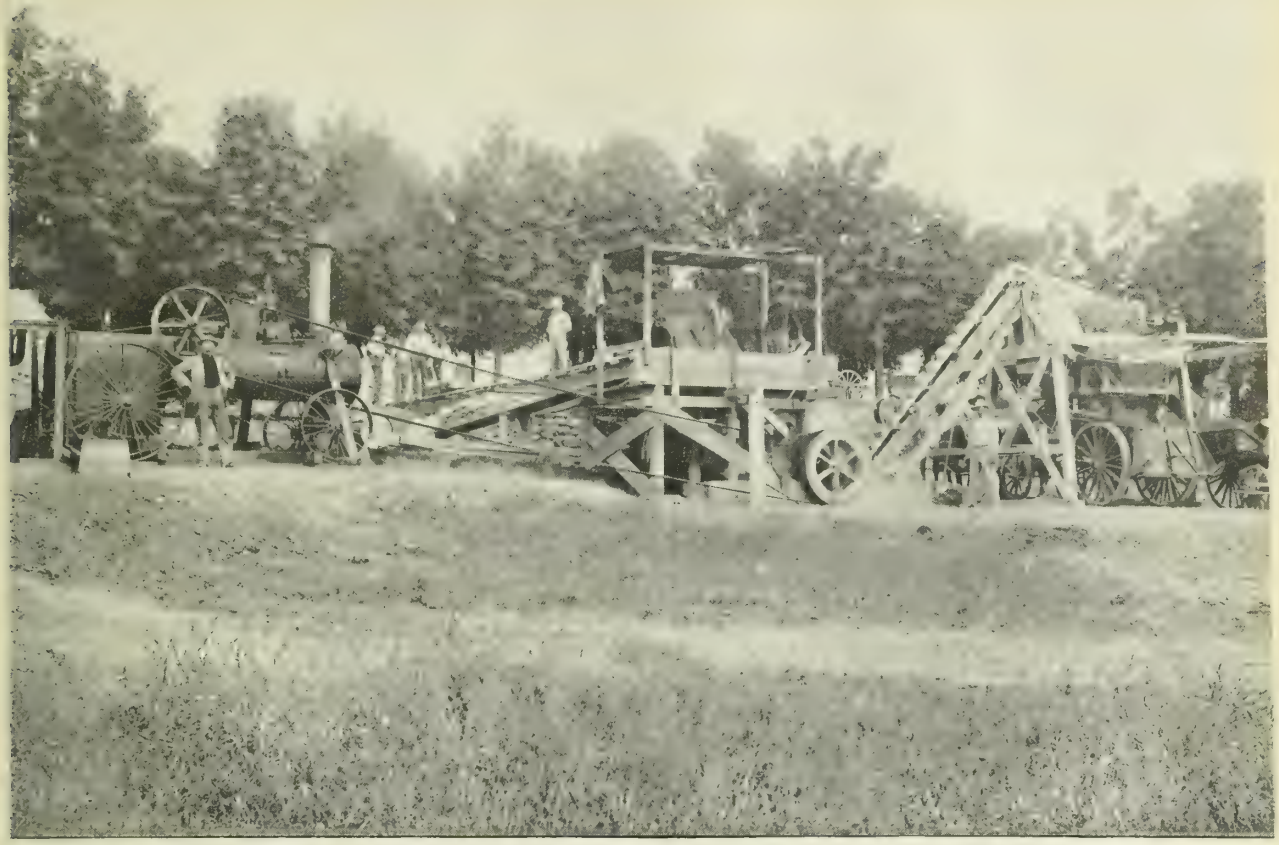
An appropriation which would place money at the disposal of every state for the construction of roads would be general in its benefits. It would not simply benefit the communities which built roads. It has already been pointed out that National Aid for highway construction would benefit almost every individual in the country and would be far more national in its scope than are a very large percent of the bills passed for internal improvement.

XII. Conclusion.

The good roads question will become a more important one with the coming years. It is difficult to predict whether or not the governments' aid will ever be enlisted for the building of a vast system of good roads. Plans which are considered impracticable, inadvisable or even impossible in one generation are often adopted in the next. It was so with Rural Free Delivery; it may be so with National Aid. But if the advocates of National Aid never succeed in obtaining the desired legislation, they will have accomplished much good by the thorough agitation of the subject. So much attention is called to the condition of the roads that those most opposed to hard roads will be compelled, in defense of their position, to lead out in the further improvement of the earth roads. If the people really want hard roads and National Aid, they will come sooner or later. If not, a serious and intelligent investigation of the subject by large numbers of the people will at least result in much improvement over the present condition of the roads of this great republic.

THE SOUTHERN RAILWAY GOOD ROADS TRAIN.

THE CRUSHING PLANT IN OPERATION, WINSTON-SALEM, N. C.



ROAD BUILDING BY U. S. DEPARTMENT OF AGRICULTURE AT GENEVA, N. Y., SHOWING CRUSHING PLANT.

FIG. 2.—ROAD BUILDING BY U. S. DEPARTMENT OF AGRICULTURE FOR NEW JERSEY AGRICULTURAL COLLEGE AND EXPERIMENT STATION, NEW BRUNSWICK, N. J.

FIG. 1.—ROAD SELECTED FOR IMPROVEMENT, GREENVILLE, TENN.

FIG. 2.—SECTION OF SAME ROAD MACADAMIZED.

OBJECT-LESSON ROAD BUILT OF CRUSHED GRANITE AT EMMA, NEAR ASHEVILLE, N. C.

OYSTER SHELL OBJECT-LESSON ROAD, MOBILE, ALA.

FIG. 1.—JEFFERSON MEMORIAL ROAD, CHARLOTTESVILLE, VA., BEFORE IMPROVEMENT.

FIG. 2.—SECTION OF RELOCATED AND IMPROVED JEFFERSON MEMORIAL ROAD.

FIG. 1.—OBJECT-LESSON ROAD AT CHATTANOOGA, TENN., BEFORE IMPROVEMENT.

FIG. 2.—SAME ROAD AFTER BEING MACADAMIZED.

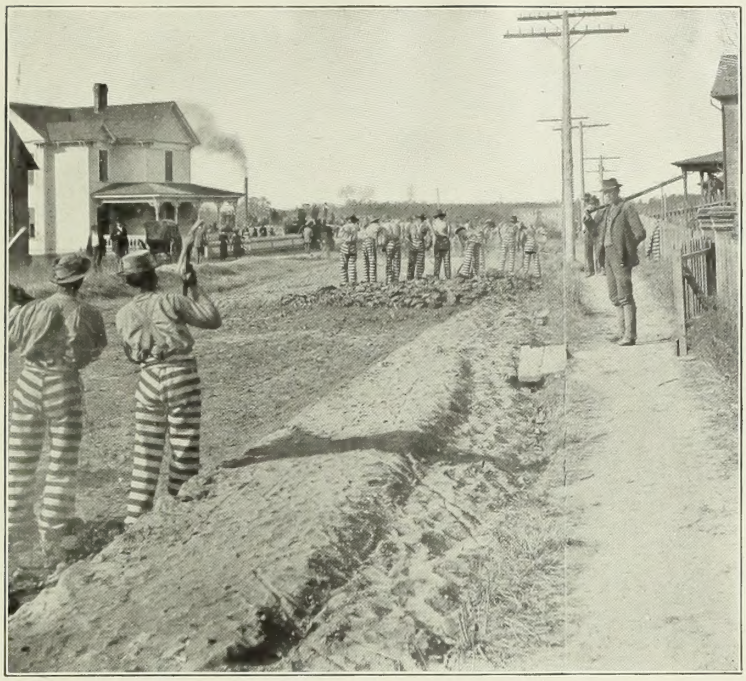


FIG. 1.—USE OF CONVICT LABOR IN PREPARING SUBGRADE, WINSTON-SALEM, N. C.

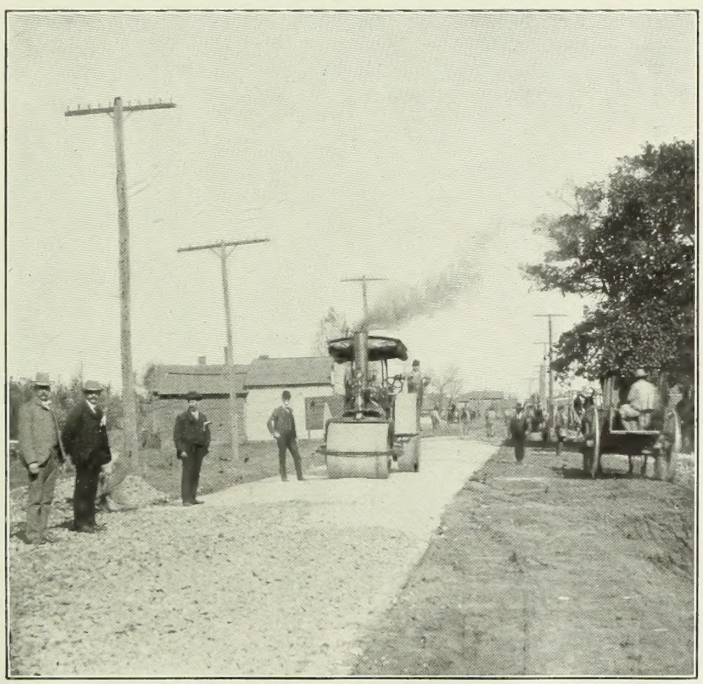


FIG. 2.—BUILDING MACADAM ROAD, WINSTON-SALEM, N. C.

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